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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
FIGUEROA, JOHN J	

ART UNIT	PAPER NUMBER
1712	

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,059	PATEL, BHARAT B.	
	Examiner	Art Unit	
	John J. Figueroa	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *18-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/8/04 & 4/21/05*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *01/09/06*.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-17, drawn to a method for reducing fluid loss from a wellbore servicing fluid, classified in class 166, subclass 283.

   II. Claims 18-31, drawn to a wellbore servicing fluid, classified in class 507, subclass 226.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case, the product (fluid composition comprising terpolymer) can be used as a detergent additive. (See, e.g., USPN 5,607,618 to Antwerpen et al.)

3. These inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification. Thus, because these inventions are distinct and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr. Rodney B. Carroll on January 9, 2006 a provisional election was made with traverse to prosecute the invention of Group I,

claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-31 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 6,030,928 to Stahl et al. (hereinafter 'Stahl').

Stahl discloses water-soluble polymers used in various processes involving a subterranean well bore (e.g., drilling, completion and workover processes under severe conditions, such as high temperature and/or high saline environments), said polymers including a terpolymer prepared by the polymerization of a monomer composition having an N-vinyl amide, such as an N-vinyl lactam, an unsaturated amide and, *inter alia*, a hydrophilic vinyl-containing sulfonate. (Abstract; col. 1, lines 12-24; col. 8, lines 2-13 and 23-38; col. 9, line 65 to col. 10, line 2) Stahl's preferred N-vinyl lactam is N-vinyl-2-pyrrolidone. (Col. 8, 39-42; col. 41, lines 33-37)

The terpolymer disclosed by Stahl can contain from about 10 to about 80 percent by weight of N-vinyl-2-pyrrolidone (NVP), from about 10 to about 55 percent of the acrylamide (Am) and about 10 to about 80 percent of a third monomer of a vinyl

containing sulfonate. (Col. 132, lines 1-31) The vinyl-sulfonate monomer can be 2-acrylamido-2-methylpropane sodium sulfonate (NaAMPS) and the terpolymer is disclosed to be NVP/Am/NaAMPS®. (Col. 18, lines 26-33; col. 21, lines 47-51)

In addition, Stahl teaches that for certain applications, there is an advantage to polymer compositions having 0-40 percent by weight of the unsaturated amide (col. 22, lines 18-22); and that polymers having a higher weight ratio of sodium-AMPS (80-95 percent) than of NVP (5-20 percent) are particularly suitable for water loss control in drilling muds, such as high temperature, geothermal drilling fluids (col. 22, lines 25-30; col. 33, lines 32-39). Consequently, Stahl is disclosing an NVP/Am/NaAMPS® terpolymer that clearly overlaps the claimed weight ratios of 3-15/3-15/75-95 respectively.

Stahl further discloses a drilling fluid, and a process of forming thereof, wherein said drilling fluid includes water, water-insoluble material (e.g. clay) and the NVP/Am/NaAMPS terpolymer. (Col. 128, line 56 to col. 129, line 20; col. 129, line 55 to col. 130, line 16; col. 130, lines 23-36; col. 131, line 29 to col. 132, line 31)

Stahl discloses that the introduction of small amounts of the terpolymer in a drilling fluid (e.g. an amount of about 0.10 to about 5 pounds per barrel of aqueous drilling fluid, i.e. approx. up to 1.2 wt. %) used in a process involving the drilling, completion and/or workover of wells, is effective enough to reduce/control water loss, particularly when employed to thicken water used to recover oil under hostile conditions at high temperatures up to 400°F (high pressure). (Col. 41, lines 12-26; col. 9, line 65 to

col. 10, line 2; Example XXV and Table XXXV on col. 92, line 30 to col. 93, line 48; Example XXVIII and Table XXXVII on col. 95, lines 20-59)

In Example XLIII, Stahl discloses using an NVP/Am/NaAMPS terpolymer, as a hostile environment control agent polymer, to reduce water loss in a high-temperature, high-pressure salt-water mud system ($NaCl$-H_2O system). Table LV depicts the results of Example XLIII and shows that the saltwater mud contained bentonite, ilite clay and barite in four percent salt water and that the water loss was measured at a temperature of 325°F and at a pressure of 500 psi. (Col. 108, line 56 to col.110, line 2).

Therefore, the claims are anticipated by Stahl.

7. Claims 1-16 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent Number 6,380,137 B1 to Heier et al. (hereinafter 'Heier').

Heier discloses water-soluble copolymers for use as a suitable additive in drilling fluids, for cementation, as completion and/or workover fluids, and/or for water shut-off; the copolymer additive displaying a very good protective colloid effect at high temperatures and in terms of aging stability and superior in reducing pressurized water and in its rheological behavior. (Col. 1, lines 5-7; col. 7, lines 4-12) The drilling fluid in Heier can be a formulated aqueous drilling fluid containing 0.5 to 4.0 kg/m^3, preferably from 3 to 30 kg/m^3, of the copolymer additive and further containing bentonite (montmorillonite clay) to increase fluid viscosity and to seal off formations. (Col. 7, lines 15-20) Heier further discloses a method for reducing water loss in an aqueous drilling

fluid, or in a deep-well slurry of water and cement by adding the aforementioned water-soluble copolymer to the aqueous drilling fluid or cement slurry. (Col. 13, lines 9-17)

Particularly, Heier discloses a process to reduce water loss in a deep well cementation process that includes adding the copolymer additive to an aqueous-cement slurry (in a preferred amount of about 0.1 to 1.0 percent by weight of cement) to improve the flow and setting properties exhibited by the resultant cement slurry. (Col. 11, lines 29-56) Heier also discloses a process for using the copolymer as an additive in a salt-water workover fluid providing low water loss at relatively high temperatures, e.g. at 100°C. (Col. 11, lines 57-67)

Heier discloses that the structural units of the copolymers are derived from, *inter alia,* acrylamido-propenylmethylene sulfonic acid or its salts, cyclic N-vinyl-substituted amides and acrylamide. (Abstract; col. 3, lines 14-36 and 41-50; col. 4, lines 5-30 and 49-64) Heier specifically discloses that the salt of acrylamido-propenylmethylene sulfonic acid can be the sodium salt. (Col. 3, lines 41-50) In Table I on col. 7-8, Heier discloses an NVP/Am/AMPS® terpolymer comprising 15% of N-vinyl-2-pyrrolidone (NVP), 7.5 of the acrylamide (Am) and 77.5% of 2-acrylamido-2-methylpropane sulfonic acid (AMPS). (Example 13, Table 1; col. 10, lines 14-17)

Furthermore, in Table 3 on col. 10, Heier discloses results of fluid-loss prevention studies involving an aqueous salt solution containing 3% KCl and said NVP/Am/AMPS® terpolymer (copolymer D) as an additive. According to Heier, the values depicted on Table 3 reflect the quality and the effectiveness of the copolymer as an additive in preventing fluid loss obtained by measuring the fluid loss and apparent viscosity of the

copolymer under a pressure of 500 psi and at 130, 150, 170, 185 and at 200°C after 30 minutes, 16 hours and 66 hours, respectively. (Col. 9, line 20 to col. 10, line 2) For example, after 66 hours at 170°C, the fluid sample including the NVP/Am/AMPS® terpolymer (Copolymer D) was determined to have lost 20 ml of water, whereas the samples containing Copolymers A & B lost 19 and 16 ml respectively and the prior art samples containing Copolymers F&G lost 37 and 38 ml of water respectively. Although the fluid sample containing Copolymer D as an additive was slightly less effective in preventing water loss when compared to the samples containing Heier's Copolymers A & B as additives, Table 3 shows that Copolymer D was a more effective drilling fluid additive in preventing water loss than Copolymers F&G. (Col. 11, lines 14-23)

Thus, though the salt-water drilling fluid sample containing copolymer D (NVP/Am/AMPS® terpolymer having a 15/7.5/77.5 weight ratio) as an additive is disclosed in Heier as a "comparative example", Table 3 clearly demonstrates that Heier is disclosing an effective method of using this particular sample to reduce water loss when compared to prior art drilling fluid samplings.

Therefore, the claims are anticipated by Heier.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-3, 5-11 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,176,315 B1 to Reddy et al. (hereinafter 'Reddy') in view of Stahl.

Stahl was discussed above in paragraph #6. Reddy discloses a method for preventing the flow of water, gas or both through a subterranean zone having a high temperature (i.e. high pressure) by including a sealing composition within the drilling fluid in the well, said sealing composition comprising water, a cross-linking agent and a water-soluble polymer. (Abstract; Col. 1, line 51 to col. 2, line 5; col. 2, lines 25-27 and 36-49; col. 3, lines 19-26; col. 15, lines 31-51)

Reddy further discloses that the water can be fresh water, unsaturated salt water, saturated salt water, brine or seawater and can contain sodium chloride or potassium chloride (col. 2, line 67 to col. 3, line 2; col. 3, lines 27-35); whereas a suitable water-soluble polymer that can be used in a process involving a subterranean zone having a temperature of from about 200°F to about 350° is a terpolymer formed of vinylpyrrolidone (NVP), AMPS® (2-acrylamido-2-methylpropane sulfonic acid) and acrylamide (Am) monomers (col. 2, lines 6-16; col. 3, lines 41-43 and 60-62; col. 15, lines 52-60; col. 16, lines 23-29).

Reddy also discloses that the water-soluble polymer utilized in the sealing composition is present in an amount of from about 0.5 to 20 percent by weight of the total composition. (Col. 4, lines 10-13). In Example 3, Reddy discloses studies using an

NVP/Am/AMPS® terpolymer as an additive in fresh water and in 0.5 to 2% potassium chloride salt-water solutions to determine the stability of the resultant gel at various pumping times (gel stability in preventing water loss). (Col. 8, line 5 to col. 12, line 35; Tables III-VI) The terpolymer used in the studies depicted in Tables III-V of Example 3 contains 30 mole percent NVP (20.23 percent by weight), 60 mole percent AMPS® (75.55 percent by weight) and 10 mole percent acrylamide (4.31 percent by weight). (Col 8, lines 5-11)

Reddy does not specifically disclose any range percent limitations regarding the weight ratios of the three monomer components of the NVP/Am/AMPS® terpolymer. The only difference regarding the weight percentages of the three monomer components between the terpolymer recited in the instant claims and the exemplary terpolymer used in Example 3 is in the amount by weight of NVP (about 15% by weight in claim 1 vs. 20.23% in Reddy's).

However, as discussed above, Stahl teaches that polymers having a high weight ratio of sodium-AMPS (80-95 percent) to NVP (5-20 percent) are particularly suitable for water loss control in drilling muds, such as high temperature, geothermal drilling fluids (col. 22, lines 25-30; col. 33, lines 32-39).

Accordingly, it would have been obvious to a person of ordinary skill in the art to add to a drilling fluid, that is used in a well bore workover/completion process at high temperature, a NVP/Am/NaAMPS® terpolymer with a higher monomeric weight ratio of NaAMPS:NVP of 80-95% of NaAMPS to 5-20 for NVP (with the balance of Am) than that of the terpolymer used in Example 3 of Reddy. It would have been within the

purview of one skilled in the art to modify Reddy's terpolymer to have a higher percentage of Na-AMPS by weight and less of VP (e.g. less than about 15% with the balance of Am) in order to attain an enhanced water loss polymeric additive to use in a method for reducing water loss that is effective in a high temperature, geothermal drilling process in accordance with the teachings in Stahl.

Moreover, because Reddy & Stahl encompass using the same terpolymer to reduce water loss in a well bore process as does the instant claims (for example, the NVP/Am/NaAMPS® terpolymer having a respective monomeric weight ratio of 5.5/3.5/91 that is recited in claim 17), then both methods will inherently reduce the fluid loss by from about 50% to about 99% when combining 2.0 wt. % of the terpolymer (by weight of the drilling fluid) with a 35/65 H_2O/K-formate-brine solution.

The claims are thus unpatentable over Reddy in view of Stahl.

Conclusion

The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure. Particularly, the Patel, Giddings and Chen patents cited as "X" references in the European search report were considered but determined not to be as relevant as the references cited above in the instant Office Action.

Patel teaches an NVP/Am/AMPS® terpolymer but does not specifically disclose range limitations for the weight ratios of the three monomer components that encompass the monomeric weight ratios recited in the instant claims. Giddings is drawn to a terpolymer additive for use in preventing fluid loss containing AMPS®, NVP

and *acrylonitrile* (not acrylamide). Chen does not disclose the recited terpolymer but instead a copolymer formed from a monomeric mixture further containing acrylic acid as a fourth monomer. Fox and Burns do disclose a terpolymer having the same three monomer components as in the instant application but do not specifically recite ranges limiting the weight ratios of the monomers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Figueroa whose telephone number is (571) 272-8916. The examiner can normally be reached on Mon-Thurs & alt. Fri 8:00-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JJF/RG

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